

Prof. Frazer explained by diagrams his new arrangement, by a side-hinged mirror, for illuminating intensely the whole field of the object under a microscope. A strong side light is reflected at a low angle from the *under* surface of a glass plate placed across the front of the objective, on to and again from the side mirror suspended from hinges, on to the object, and so back through the tube to the eye of the observer.

The minutes of the last meeting of the Board of Officers and Council were read.

Pending nominations Nos. 893, 894, 895, and new nominations Nos. 896, 897 were read.

And the meeting was adjourned.

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*Stated Meeting, March 5, 1880.*

Present, 17 members.

President, Mr. FRALEY, in the Chair.

A letter accepting membership was received from Mr. Archibald Geikie, dated Geological Survey Office, Edinburgh, Feb. 2.

Letters of acknowledgment were received from the Natural History Society, Emden, dated Nov. 15 (102); the Royal Society of Luxembourg, dated Aug. 20 (102); the Société Hollandaise, dated Harlem, Sept 20 (102, 103); and the Surgeon General's Office, at Washington, dated Feb. 20 (104).

Letters of envoy were received from the Trigonometrical

Survey of India, dated Dehra Dun, Jan. 20 ; the Natural History Society, dated Emden, Nov. 15 ; the Royal Saxon Society, dated Leipsig, Oct. 25 ; the Imperial Academy, dated Vienna, Dec. 1 ; the Société Hollandaise, dated Harlem, Dec. ; the U. S. Naval Observatory, and Department of the Interior, dated Washington, Feb. 19.

A letter respecting Dr. Gabb's memoir was received from Mr. R. S. Swords, acting Librarian of the New Jersey Historical Society, dated Newark, March 3.

Donations for the Library were received from the Mining Bureau at Victoria ; the Repertorium für Meteorologie at St. Petersburg ; the Academies at Berlin, Vienna, Rome, and Brussels ; the Societies at Moscow, Stuttgart, Halle, Giessen, Emden, Bordeaux, Liège, and Harlem ; the Swedish Bureau of Statistics ; the German Geological Society at Berlin ; the Geological Association at Dresden ; the Revue Politique ; the Grand Ducal Institute at Luxembourg ; the Minister of the Interior at Brussels ; the London Astronomical, Geographical and Meteorological Societies ; Society of Arts, and London Nature ; the Essex Institute ; the New York Academy of Sciences ; the Brooklyn Entomological Society ; the North American Entomologist ; Dr. Wm. Elder ; Mr. W. B. Taylor ; the U. S. Department of the Interior ; the Army Bureau ; the Journal of Pharmacy, at Philadelphia ; the Cincinnati Observatory ; the St. Louis Public School Library ; the Kansas Historical Society ; and the San Francisco Mercantile Library Association.

An obituary notice of the late John W. Harden was read by Mr. Lesley.

The death of Gen'l Clement A. Finley, in West Philadelphia, September, 1879, was announced by the Secretary.

On motion the committee on the paper of X. Y. Z. for the Magellanic premium, was entrusted with the care of the document for examination, to report.

Mr. Ashburner exhibited specimens and photographs of Oil Sands, and read a paper on the constitution of the Brad-

ford Oil Sand of McKean county, Pennsylvania. Remarks were made by Dr. Rogers and Mr. Lesley.

Prof. Frazer exhibited his microscopic reflector, made by Mr. Zentmeyer.

Mr. Frazer then discussed the principles of the problem of the popular 15 number puzzle with Mr. Briggs.

Pending nominations Nos. 893 to 897, and new nominations Nos. 898 to 901 were read.

On motion, the subject (postponed from the last meeting) of appointing delegates to assist at the Centennial Anniversary of the American Academy of Science and Art, at Boston, was referred to the President, Mr. Fraley, with power to act.

And the meeting was adjourned.

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*On the Constitution of the Bradford Oil Sand. By Chas. A. Ashburner, M.S., Asst. Second Geological Survey of Pennsylvania. (With a plate.)*

(Read before the American Philosophical Society, March 5, 1880.)

The constitution of the petroleum sands of Western Pennsylvania, which were discovered in Venango county twenty-one years ago, and which have ever since been producing mineral oil, is no doubt familiar to most of our geologists. The question suggests itself; in what way is the Bradford sand of McKean county, Pennsylvania, and Cattaraugus county, New York, dissimilar?

Before describing the structure of the sands, permit me to give some general facts showing the relative per centage of *dry holes* and the out-put of the *producing wells* in the two districts. At a glance, the comparison will indicate that some essential differences must exist in the sands and mode of occurrence of the oil, to account for the different results which have been obtained.

During the year 1879, there were 475 wells drilled to the Venango oil